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Subject: Comments on WTC Report
From: RTucker@rjagroup.com

Attached are our comments on the WTC report. Please contact me if you have any questions.

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[Comment on Recommendation 4.pdf](#)



[Comment on Recommendation 8.pdf](#)



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[Comment on Recommendation 17.pdf](#)



[Comment on Recommendation 27.pdf](#)



[Comment on Threshold Height.pdf](#)

Name: Randolph W. Tucker, P.E.

Affiliation: The RJA Group, Inc.

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Report Number: NCSTAR 1

Page Number: 204

Paragraph/Sentence: Recommendation 4

Comment:

This recommendation is an overreaction to an extreme incident.

Reason for Comment:

Statistically, the life safety performance of commercial buildings in the U.S. has been quite good based upon the current model codes. The improbable scenario of the WTC event should not cause such major rewrites of our codes which until now have generally provided a level of fire safety which meets societal acceptance of risk. The US codes and standards organizations are regularly reviewing and modifying their requirements based on analysis of fire records, changing design styles, new materials, and new technology.

This recommendation for more stringent prescriptive requirements appears to not account for the benefits gained by improvements in performance-based engineering approaches noted in Recommendation 9.

Suggestion for Revision:

The recommendation should be to continue to evaluate the appropriateness of building and fire code requirements to improve overall building safety and security performance. The application of performance-based design should be applied to unusual buildings (very tall, unique configuration, large occupancy, etc) rather having the codes and standards develop mandatory prescriptive requirements for all buildings over a certain height or area.

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Paragraph/Sentence: Recommendation 8

Comment:

Although an interesting suggestion, such requirement would be difficult to enforce.

Reason for Comment:

The recommendation assumes that a designer can fully predict the fuel loading, maintenance of structural integrity (penetrations, removal of protective coatings or materials, maintenance of fire rated separations, etc) over the life of a building. The fire record in tall buildings in the US has not indicated that the current code requirements, if properly followed and maintained, are not sufficient for the types of fires that have occurred in buildings. The only examples where total or local structural collapse from a fire in tall buildings have occurred have been in extreme cases (WTC). The only incidents we are aware of where fire caused significant structural failure were in unsprinklered high rise buildings where retrofit sprinklering was in progress, but not completed (Meridian Plaza – Philadelphia; First Interstate – Los Angeles).

Should such a requirement be in a building code, there would be no reasonable way for a designer to assure compliance over the life of the building.

Suggestion for Revision:

Delete the comment.

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Paragraph/Sentence: Recommendation 12

Comment:

Reliability of system performance is currently addressed in existing fire safety system design and installation standards and reinforced through requirements in building and fire codes.

Reason for Comment:

Each of the fire safety system standards committees regularly reviews available information on system performance as well as system failures. The standards set minimum levels of performance and reliability requirements for these systems for application in a broad range of applications. It is incumbent on system designers to determine when additional reliability may be necessary based on unique building characteristics or operational needs.

System performance and reliability comes from proper design, installation, commissioning, maintenance, and periodic testing. All of these considerations are currently in the IBC, NFPA 5000, IFC, and UFC. Where improvement may be necessary is in the enforcement of what is currently required not from adding more requirements.

Suggestion for Revision:

Designers, installers, building managers, and AHJ's should do a better job of analysis of reliability factors in unusual design and use buildings to match the system fire safety systems' design and reliability to the needs of the building.

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Paragraph/Sentence: Recommendation 17

Comment:

This requirement is not justified by US fire history for code compliant buildings.

Reason for Comment:

By their very nature and definition, high rise buildings take a great deal of time to exit. Based on this fact, the design of tall buildings has evolved to a concept of staged egress while protecting occupants by active fire and life safety systems. Even in the WTC event, NIST's review indicated that nearly all of the occupants below the impact levels were able to use the stairs to get out of the building. While the considerations presented in Recommendation 17 (and Recommendation 21) may have some merit, attempting to establish a "timely full evacuation" of very tall buildings is at best infeasible.

The life safety in tall buildings may be enhanced by increased stair width and the ability to use elevators for emergency use, however, an analysis of credible building threats and how to design to mitigate such threats may offer a better cost/benefit return than by increasing the number of stairs or elevators.

Suggestion for Revision:

Develop data on emergency evacuations that have occurred in buildings that demonstrates whether the existing building code requirements are sufficient to meet emergency egress and emergency responders' needs.

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Paragraph/Sentence: Recommendation 27

Comment:

Installation standards currently have requirements for on-site copies of life safety systems. Unfortunately, when these systems are modified or upgraded, such changes are not generally added to the original documents.

Reason for Comment:

While it would be beneficial to have up-to-date documents on the property, it is a difficult enforcement issue. Further, attempting to also keep an off-site set of documents would prove even more difficult. Where off-site should they be? Who is to be their custodian? Who can verify that the off-site documents are current? Who will assure that these documents are secure from access by unauthorized persons?

Suggestion for Revision:

Establish where the off-site repository is to address the security issue while also assuring the proper updating of the documents will occur.

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Paragraph/Sentence: Second bulleted paragraph (starting "Affected...")

Comment:

Although we agree with the concept of thresholds for tall building requirements, the selected threshold of 20 stories for the majority of the items addressed in the recommendations may be inappropriate.

Reason for Comment:

Currently the IBC and NFPA 5000 define a high rise building as one having occupied floors at a height of over 75 feet above fire department vehicle access. Certainly, as building heights reach other thresholds, such as the 20 storey height NIST suggests, other reliability issues come into play. The requirements and redundant features that may be appropriate for a 100+ story building may not be necessary for a 20, 40, or 60 story building.

Suggestion for Revision:

Each of the recommendations that deal with building design requirements should be reevaluated for appropriateness at the 20 story threshold.